

CLAIMS

What is claimed is:

1. A joining system, comprising:
5 a main unit having a control device; and
a joining unit including at least a first module and a second module;

wherein the control device operably recognizes a compatibility of at least the first module, the second module and the main unit.

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2. The joining system of Claim 1, further comprising a series of fastening elements operably secured by the first module.

3. The joining system of Claim 2, comprising a welding arc
15 operably provided by the first module wherein the welding arc is operable to weld the fastening elements.

4. The joining system of Claim 3, wherein the first module further comprises a lifting device which operably moves each of the fastening
20 elements away from a workpiece to be welded after an initial low current arc is created and then moves each of the fastening elements toward the workpiece after a higher current welding arc has been created by the first module.

5. The joining system of Claim 1, wherein the main unit comprises
25 a non-volatile memory accessible by the control device.

6. The joining system of Claim 5, wherein the non-volatile memory comprises a flash memory containing blocks of software programs.

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7. The joining system of Claim 6, further comprising:
a random access memory accessible by the control device;
an operator terminal connected to the control device, the
operator terminal allowing manual operator control of the control device; and
5 a plurality of welding process parameters being stored in the
random access memory.

8. The joining system of Claim 1, further comprising:
operating system software;
10 first process software operable to control a first welding process
for a first fastening element;
second process software operable to control a second welding
process for a second fastening element having a different characteristic than
that of the first welding process;
15 analysis software; and
communications software;
wherein each of the software is accessible by the main unit.

9. The joining system of Claim 8, comprising:
20 a steel material for the first fastening elements wherein the first
process software operably controls welding of the first fastening elements;
and
an aluminium-based material for the second fastening elements
wherein the second process software operably controls welding of the second
25 fastening elements.

10. The joining system of Claim 8, comprising:
a first shape of the first fastening elements wherein the first
process software operably controls welding of the first fastening elements;
and

5 a second and different shape of the second fastening elements
wherein the second process software operably controls welding of the second
fastening elements.

11. The joining system of Claim 1, wherein the first module of the
10 joining unit is a first welding module and the second module of the joining unit
is a fastener feeding module.

12. The joining system of Claim 11, further comprising a plurality of
fasteners, wherein the joining unit further includes a second welding module,
15 the fastener feeding module operably supplying the fasteners in a pneumatic
manner to both the first and second welding modules.

13. The joining system of Claim 8, further comprising a process
parameter block stored in a memory accessible by the control device for each
20 of the first and second process software.

14. The joining system of Claim 13, wherein each of the first and
second process software operably controls an arc welding process.

25 15. The joining system of Claim 1, further comprising:
a metallic fastening element; and
a metallic sheet having a mating surface;
wherein the control device operably causes the first module of
the joining unit to initially clean the mating surface and then subsequently
30 weld the fastening element to the mating surface.

16. The joining system of Claim 1, comprising:
a plurality of programming of the control device;
wherein the control device operably determines a compatibility
of the joining unit with the programming of the control device.

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17. The joining system of Claim 1, further comprising:
a plurality of stored process software; and
a code operably allowing one of access to and disablement of
the stored process software.

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18. The joining system of Claim 1, comprising:
a recognition procedure;
wherein the control device operably repeats the recognition
procedure to determine mutual compatibility of at least the modules of the
joining unit and the main unit at regular intervals.

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19. An arc welding system, comprising:
a computerized control device; and
memory connected to the control device, the memory having
stored therein at least the following computer program modules:

5 first process software operable to control a first welding
process; and

second process software operable to control a second
welding process different than that of the first welding process;

the control device automatically accessing the appropriate
10 process software depending upon an equipment type connected to the
welding system.

20. The arc welding system of Claim 19, further comprising:
a plurality of fasteners; and

15 an arc welding module operably arc welding each of the
fasteners to a workpiece;

wherein the control device operably actuates the arc welding
module.

20 21. The arc welding system of Claim 20, comprising:
an initial low current arc operably created by the arc welding
module;

a high current welding arc operably created by the arc welding
module; and

25 a lifting device included with the arc welding module;

wherein the lifting device operably moves each of the fasteners
away from the workpiece after the initial low current arc is created and then
moves each of the fasteners toward the workpiece after the high current
welding arc is created.

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22. The arc welding system of Claim 19, comprising:
a plurality of steel first fastening elements wherein the first
process software operably controls welding of the first fastening elements;
and

5 a plurality of aluminium-based second fastening elements
wherein the second process software operably controls welding of the second
fastening elements.

23. The arc welding system of Claim 19, comprising:
10 a plurality of first fastening elements having a first shape,
wherein the first process software operably controls welding of the first
fastening elements; and

a plurality of second fastening elements having a second
shape different from the first shape, wherein the second process software
15 operably controls welding of the second fastening elements.

24. The arc welding system of Claim 19, further comprising:
a random access memory accessible by the control device;
an operator terminal connected to the control device, the
20 operator terminal allowing manual operator control of the control device; and
a plurality of welding process parameters being stored in the
random access memory.

25. The arc welding system of Claim 19, further comprising:
25 a joining unit operably controlled by the control device; and
a plurality of programming of the control device;
wherein the control device operably determines compatibility
of the joining unit with the programming of the control device.

30 26. The arc welding system of Claim 19, comprising a code
operably allowing one of access to and disablement of the stored first and
second process software.

27. The arc welding system of Claim 19, comprising a process parameter block stored in the memory and accessible by the control device for each type of the stored process software.

- 5 28. The arc welding system of Claim 19, wherein the memory comprises a non-volatile flash memory having the software contained in a plurality of blocks.

29. A method of operating a joining system having a main controlling unit and a metal joining unit, the method comprising:
communicating between the main controlling unit and the joining unit; and

5 recognizing a compatibility of at least a portion of the joining unit with the main controlling unit.

30. The method of Claim 29, comprising:
feeding a metallic weld stud from a first module of the joining unit to a second module of the joining unit; and
10 creating an electrical arc for welding of the weld stud using the second module.

31. The method of Claim 30, comprising:
15 querying as to whether the joining unit is compatible with any of a plurality of computer programs accessible by the main controlling unit; and
enabling at least one of the computer programs which controls welding if the joining unit is compatible with the queried computer program.

20 32. The method of Claim 29, comprising accessing any one of the computer programs operable to control a welding process within a flash memory in communication with the main controlling unit.

33. The method of Claim 29, comprising:
25 selecting a parameter block type containing a plurality of welding parameters from a memory; and
interrogating only the welding parameters which are of relevance to a relevant welding process computer program.

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34. The method of Claim 29, comprising preventing repeated polling of parameters which are not contained in parameter block types during programming of parameter blocks of the same type for successive welding operations within an overall process.

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35. A method of operating an arc welding system having a controller and a plurality of machines associated with elements to be welded, the method comprising:

- 5 (a) transmitting a signal between the controller and at least one of the machines;
- (b) ascertaining if a predetermined code is present;
- (c) allowing implementation of a first computer program if the predetermined code is of a first type;
- (d) implementing a second computer program if the
10 predetermined code is of a second type; and
- (e) energizing the machines for arc welding in response to the appropriate computer program implementation in the controller.

36. The method of Claim 35, comprising:

- 15 feeding a metallic weld stud from a first of the machines to a second of the machines; and
- creating an electrical arc for welding of the weld stud using the second of the machines.

20 37. The method of Claim 35, comprising:

- querying as to whether the machines are compatible with any of the computer programs; and
- enabling at least one of the computer programs which controls weld processing if a corresponding one of the machines is compatible with the
25 enabled computer program.

38. The method of Claim 35, comprising accessing one of the computer programs for controlling weld processing within a flash memory in communication with the controller.

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39. The method of Claim 37, comprising:
- selecting a parameter block type from a memory containing a plurality of welding parameters; and
 - interrogating only select ones of the parameters which are of
- 5 relevance to the enabled computer program which controls weld processing.

40. The method of Claim 35, comprising polling at least one of the computer programs at regular but delayed intervals.